



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

From the similar triangles CMB and CAN

$$\frac{a}{m} = \frac{a+y}{\sqrt{(c^2-y^2)}}, \text{ or } a^2c^2 - a^2y^2 = a^2m^2 + 2am^2y + m^2y^2,$$

$$\text{whence } (m^2 - c^2)a^2 + (m^2 + a^2)y^2 + 2am^2y = 0. \quad (2)$$

Substituting the value of y from (1) we have

$$(m^2 - c^2)a^2 + (m^2 + a^2)\left(\frac{k}{a} - n\right)^2 + 2am^2\left(\frac{k}{a} - n\right) = 0,$$

$$\text{or } (m^2 - c^2)a^4 + (m^2 + a^2)(k^2 - 2akn + a^2n^2) + 2a^2m^2(k - an) = 0,$$

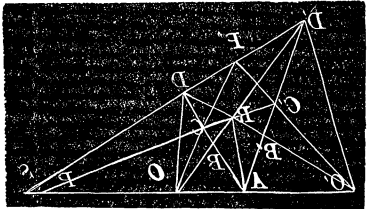
which by expansion and reduction becomes

$$(m^2 + n^2 - c^2)a^4 - 2n(k + m^2)a^3 + [m^2(n^2 + 2k) + k^2]a^2 - 2knm^2a + k^2m^2 = 0,$$

from which to find a .

NOTE.— This problem has been known in schools under the following form. A tree of known height n , standing on a side hill, was broken over by the wind, and while still clinging to the stump its top touched the ground at a distance c from the foot of the stump. The perpendicular distance from the foot of the tree to the broken over part was measured and found to be m ; required the height of the stump.

DEMONSTRATION OF THE THEOREM OF APOLLONIUS AND ITS RECIPROCAL BY W. E. HEAL.—1. Let $ODD'O'$ be a quadrilateral; A, P' points taken in opposite sides. The diagonals of the quadrilaterals $ODD'O', ODP'A, O'DP'A$ intersect in p'ts that lie in a straight line, CRC' .



2. In any quadrilateral $AB'RS$ let a p't B be joined to two opposite vertices, A, R . The lines $DD', OC, O'C'$ joining the intersection of opposite sides of the original quadrilateral and of the two derived quadr's meet in a point, P' .

To prove 1, produce $D'D, O'O$ to meet in P . The lines $ABCD, PDP'D'$ cutting the pencil AOD give $[ABCD]^* = [PDP'D']$. The lines $PDP'D'$ cutting the pencil $AO'D'$ give $[PDP'D'] = [AD'C'B']$; $\therefore [ABCD] = [AD'C'B']$. The points $A, B, C, D; A, B', C', D'$ having the same anhar. ratio and one point, A , common, the lines BD', CC', DB' joining the other corr. points meet in a point R ; $\therefore C, R, C'$ are in the same straight line.

To prove 2, join R, A . The lines $ABCD, AB'C'D$ cutting the pencil ARD give $[ABCD] = [AD'C'B']$. The pencils $O'OD, OO'D'$ having the same anhar. ratio and one ray OO' common, the intersections D, P', D' of the other corr. rays lie in a straight line. That is $DD', OC, O'C'$ meet in a point.

*The notation $[ABCD]$ denotes the anharmonic ratio of A, B, C, D .